



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : H04Q 7/22, H04M 11/06		A1	(11) International Publication Number: WO 98/09452 (43) International Publication Date: 5 March 1998 (05.03.98)
<p>(21) International Application Number: PCT/SE97/01276</p> <p>(22) International Filing Date: 15 July 1997 (15.07.97)</p> <p>(30) Priority Data: 9603133-1 29 August 1996 (29.08.96) SE</p> <p>(71) Applicant (for all designated States except US): TELIA AB (publ) [SE/SE]; Mårbackagatan 11, S-123 86 Farsta (SE).</p> <p>(72) Inventors; and</p> <p>(75) Inventors/Applicants (for US only): BODIN, Ulf [SE/SE]; Ljunggatan 2, S-973 31 Luleå (SE). ERIKSSON, Anders [SE/SE]; Timmervägen 3, S-972 33 Luleå (SE).</p> <p>(74) Agent: KARLSSON, Berne; Telia Research AB, Rudsjöterrassen 2, S-136 80 Haninge (SE).</p>		<p>(81) Designated States: NO, US, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).</p> <p>Published</p> <p><i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p>	
<p>(54) Title: TELECOMMUNICATION SYSTEM COMPRISING A CONNECTION TO AN OPEN DATA NETWORK</p> <p>(57) Abstract</p> <p>Telecommunication system including one or more mobile terminals (MT), one or more base stations, and connection to an open data network (for instance Internet). The connection to the open data network (for instance Internet) is made via a distributed presentation bridge (DVB) which includes a function (DTHF) to handle communication with a mobile terminal and a function (DVF) to handle communication with client computers which execute programs on behalf of the mobile terminal (MT). The system implies that multimedia applications which are resource demanding can be offered via a mobile terminal.</p>			
<pre> graph LR MT[MT] --> BS[BS] BS --> VX[VX] VX --> AP[AP] AP --- DVB[DVB] DVB --- DVF[DVF] DVB --- DTHF[DTHF] DVB -.-> OpenNet((Open Data Network, for instance Internet)) KD[KD] --- OpenNet KD2[KD] --- OpenNet KD3[KD] --- OpenNet ... KDN[KD] --- OpenNet </pre>			

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TELECOMMUNICATION SYSTEM COMPRISING A CONNECTION TO AN OPEN DATA NETWORK**TECHNICAL FIELD**

5 The invention relates to a telecommunication system according to the introduction to patent claim 1.

PRIOR ART

Within the prior art there are different solutions with a type of distributed execution and ways of working. Some 10 examples are presented below.

- By WO,A2,9531872 a method is shown to execute computer demanding applications in a distributed way by means of a powerful computer and after that show the result on a local station.
- 15 Further is shown by the document WO,A1,9204670 a system for distributed access to a database which implies that a key is collected in a distant computer via a modem. The key after that makes the database accessible to the user who is charged automatically.
- 20 The American patent document 5 335 276 describes a multicomunication device where appplication programs are provided from external computers.

TECHNICAL PROBLEM

- 25 The use of mobile telephones has during the recent years grown in an explosive way. This has resulted in that users want to communicate via the mobile network with bigger and bigger applications. Parallell with this development the number of users connected to the global data network
- 30 Internet is steadily growing. It is even today possible to get access to Internet via the mobile telecommunication network by connecting a computer to a mobile telephone. There also exist products which offer HTML-presentations of simple construction built into a mobile terminal.
- 35 Problems however will arise at utilization of more advanced Internet-based applications which require large main

memory, hard disk and powerful processors. Such applications will in the future probably be in even greater demand.

At the same time the trend is going towards even smaller,
5 lighter and more simple mobile terminals.

One aim with the invention consequently is to via a mobile telephone provide large applications without needing to make the mobile telephones larger and more complex. Another aim is to offer a concept which makes possible small, light
10 and electricity-saving mobile terminals which yet can offer advanced services such as Java-applications, real time applications, memory demanding applications etc, and to improve the public telecommunication network by a better infrastructure for subscribers.

15

THE SOLUTION

The technical solution of the above indicated problems are shown by what is indicated in patent claim 1.

20 ADVANTAGES

A telecommunication system according to the invention makes possible that multimedia applications which are resource demanding can be offered via a mobile terminal. The mobile terminal can be constructed in a way which is independent
25 of which applications that shall be offered.

Another advantage with this concept is that the way of presentation on the mobile terminal is quite transparent to the applications of the client computers. This further
30 results in that the software which is executed in the client computer can be changed and upgraded quite without intervention by the owner or user of the mobile terminal. One in this way can to mobile application users offer an integrated variety of applications which always comes up to
35 the latest on the market.

DESCRIPTION OF FIGURES

In Figure 1 a comprehensive sketch over the system solution according to the invention is presented.

5 DETAILED DESCRIPTION

In order to facilitate the understanding of the present invention an explanation of the used abbreviations is first given.

10 **DTHF: Distributed Terminal Handling Function.**

DVF: Distributed Presentation Function.

DVB: Distributed Presentation Bridge.

15 **VX: Public Telecommunication Exchange**

MT: Mobile Terminal.

20 **KD: Client Computer.**

BS: Base Station.

AP: Access Point.

25 In Figure 1 the concept according to the invention is shown with a number of client computers (KD) which are connected to an open data network, for instance Internet. Further is shown a mobile terminal (MT) and a distributed presentation bridge (DVB), as well as other network functions.

30 In the distributed presentation bridge two functions are included which are called Distributed Presentation Function (DVF) and the Distributed Terminal Handling Function (DTHF), which functions are explained below.

In the distributed presentation bridge (DVB) a distributed terminal handling function (DTHF) is included, which has the task of handling the communication with the mobile terminal (MT). When the mobile terminal is activated for 5 use according to the concept according to the invention, the connection is made by the mobile terminal (MT) establishing a two-way data connection to the distributed terminal handling function (DTHF) via an open data network such as for instance Internet. This connection procedure 10 includes necessary security control to guarantee the identity of the mobile terminal (MT).

After that the mobile terminal (MT) can signal to the distributed terminal handling function (DTHF) via for instance keyboard or mouse which is connected to the mobile 15 terminal. At transmission of for instance pictures via Internet, they first are transmitted to the distributed presentation function (DVF) included in the distributed presentation bridge, and then further to distributed terminal handling function (DTHF). In (DTHF) the pictures 20 are compressed by some suitable picture compressing algorithm, for instance Mpeg or Mjpeg. The compressed pictures then are transmitted to the mobile terminal (MT). When the system shall be disconnected, the mobile terminal (MT) can ask for disconnection from the distributed 25 terminal handling function (DTHF), which has functionality for this, which then breaks the connection between the mobile terminal (MT) and the distributed terminal handling function (DTHF).

30 The functional parts which the distributed terminal handling function (DTHF) includes are the following:

- 1) Connection between MT and DTHF.
- 35 2) Identification of MT.

- 3) Authentication of MT.
- 4) Compression of pictures.
- 5) Forwarding of signals from MT to DVF.
- 6) Disconnection between MT and DTHF.

The distributed presentation function (DVF) has as its task
10 to handle the communication with the client computers which
execute programs on behalf of the mobile terminal (MT).
The distributed presentation function (DVF) functions on
the whole as an X-server to which the client computers can
connect. The application programs consequently execute in
15 the client computers, but input data (signals from keyboard
and mouse) and output data (screen presentation) is handled
by the distributed presentation function (DVF). The main
difference in relation to an X-server is that the
distributed presentation function (DVF) only utilizes the
20 mobile terminal (MT) as picture screen, keyboard and mouse.
This is made via the distributed terminal handling
function, (DTHF) which handles the communication with the
mobile terminal (MT).
The distributed presentation function (DVF) receives input
25 data from the mobile terminal (MT) via the distributed
terminal handling function (DTHF) and forwards these to
client computer in question. The distributed presentation
function (DVF) also forwards output data from the client
computers to the mobile terminal (MT) via the distributed
30 terminal handling function (DTHF).
The part related to security in the communication with the
distributed presentation function (DVF) is handled by the
client computers. These computers identify and authenticate
the user when he/she asks for a connection via the
35 distributed presentation bridge (DVB) in the same way as if

the distributed presentation bridge (DVB) were an ordinary computer connected to the open data network.

The distributed presentation bridge (DVB) includes the following functional parts:

- 5 1) X-server
- 2) authenticating
- 3) etc.

10 The system solution implies that multimedia applications which are resource demanding can be offered via a mobile terminal. The mobile terminal can be constructed in a way which is independent of which applications that are offered. This is possible by that the applications execute in client computers connected to an open data network. The 15 functions of the mobile terminal is only two-way sound communication, two-way data communication, decompression of pictures and function handling of picture screen, keyboard and mouse. This results in that the mobile terminal can be kept simple but yet offer advanced resource demanding 20 multimedia services. The services which can be offered with this system solution or concept are for instance "video on demand", video games, word processor, traditional and interactive TV.

PATENT CLAIMS

- 1) Telecommunication system including one or more mobile terminals (MT), one or more base stations and connection to an open data network (for instance Internet)
5 characterized in that the connection to the open data network (for instance Internet) is made via a distributed presentation bridge (DVB) which includes a function (DTHF) to handle communication with a mobile terminal, and a function (DVF) for handling of communication with client computers which execute programs on behalf of the mobile terminal (MT).
- 10
15 2) Telecommunication system according to patent claim 1, characterized in that the programs which are executed are constructed as and has the same construction as the program language Java.
- 20
25 3) Telecommunication system according to patent claim 2, characterized in that the mobile terminal consists of a terminal of optional type of construction and is independent of which applications that are executed.
- 30
35 4) Telecommunication system according to patent claim 2, characterized in that (DTHF) includes the following functional parts:
 - 1) Establishing of connection between MT and DTHF.
 - 2) Identification of MT.
 - 3) Authentication of MT.
 - 4) Compression of pictures.
 - 5) Forwarding of signals from MT to DVF.
 - 6) Disconnection between MT and DTHF.
- 40
45 5) Telecommunication system according to patent claim 2, characterized in that (DVF) includes in the main the following functional parts:

1) x-server

2) authentication

6) Telecommunication system according to any of the
5 previous patent claims, characterized in that
multimedia applications which are resource demanding are
offered via a mobile terminal.

7) Telecommunication system according to any of the
10 previous patent claims, characterized in that
the way of presentation on (MT) is quite transparent to the
applications of the client computers, which means that the
software which is executed in (KD) can be changed and
upgraded quite without interference from the user or the
15 owner of (MT).

8) Telecommunication system according to any of the
previous patent claims, characterized in that
resource demanding applications such as for instance
20 pictures are executed in (KD) and that other parts are
executed in (MT).

9) Telecommunication system according to any of the
previous patent claims, characterized in that
25 the part related to security in the communication with the
distributed presentation function (DVF) is handled by the
client computers (KD) which identify and authenticate a
user when he/she asks for a connection via the distributed
presentation bridge (DVB) in the same way as if the
30 distributed presentation bridge (DVB) were an ordinary
computer connected to the open data network.

10) Telecommunication system according to any of the
previous patent claims, characterized in that
35 input data (signals from keyboard and mouse) and output

data (picture screen presentation) are handled by the distributed presentation function (DVF).

11. Telecommunication system according to any of the previous patent claims, characterized in that the functions of the mobile terminal are only two-way sound communication, two-way data communication, decompression of pictures, and function handling of picture screen, keyboard and mouse.

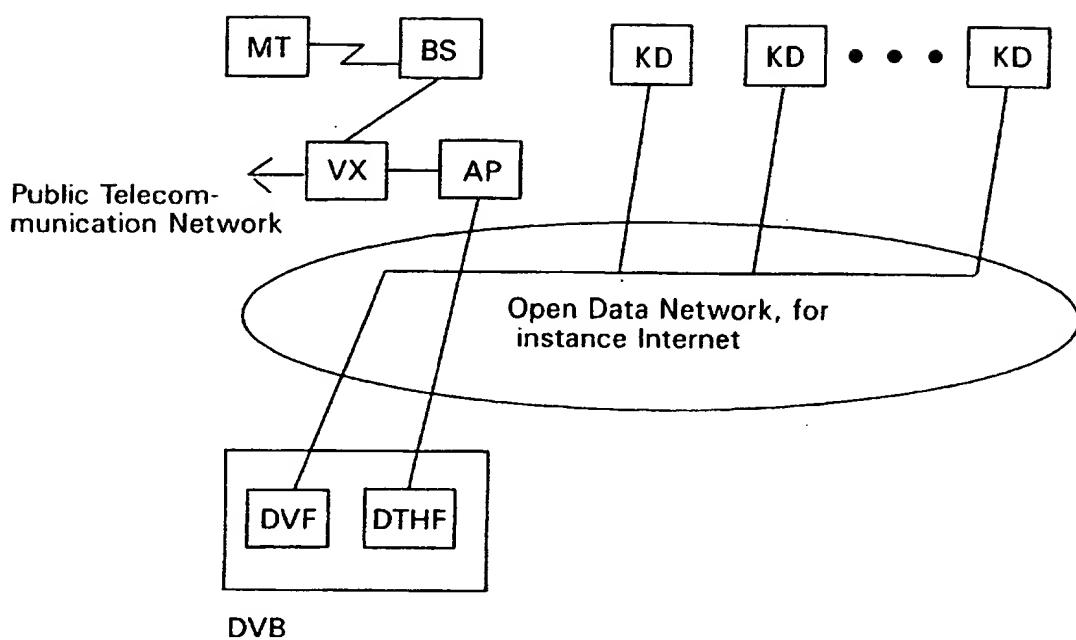


Figure 1

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 97/01276

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: H04Q 7/22, H04M 11/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: G06F, H04L, H04M, H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE, DK, FI, NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CLAIMS, WPI, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	WO 9714244 A1 (SONY CORPORATION), 17 April 1997 (17.04.97), page 8, line 48 - page 9, line 54, abstract	1,4,6-9,11
P,A	---	2,3,5
X	WO 9508900 A1 (NOKIA TELECOMMUNICATIONS OY), 30 March 1995 (30.03.95), page 4, line 24 - page 5, line 25; page 7, line 25 - page 11, line 10	1,5-9,11
Y	---	3

Further documents are listed in the continuation of Box C. See patent family annex.

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Date of the actual completion of the international search

18 December 1997

Date of mailing of the International search report

29-12-1997

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Authorized officer

Bo Gustavsson
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INTERNATIONAL SEARCH REPORT

International application No.

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 9521492 A2 (MOTOROLA INC.), 10 August 1995 (10.08.95), page 5, line 10 - page 11, line 26	1
Y	---	3
A	JP 8125746 A (TOSHIBA CORP), 17 May 1996 (17.05.96) -----	1-11

INTERNATIONAL SEARCH REPORT

Information on patent family members

02/12/97

International application No.

PCT/SE 97/01276

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WO 9508900 A1	30/03/95	AU 678534 B AU 7658694 A CN 1133666 A EP 0720806 A FI 98687 B,C FI 934115 A JP 9505951 T	29/05/97 10/04/95 16/10/96 10/07/96 15/04/97 21/03/95 10/06/97
WO 9521492 A2	10/08/95	CA 2156636 A FI 954571 A JP 8508870 T SE 9503360 A US 5533019 A	10/08/95 27/09/95 17/09/96 30/11/95 02/07/96
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